

Chapter III

Air Quality Management

Overview

Due to both rapid industrial and population growth, Mexico is experiencing many of the same environmental problems that highly industrialized nations have struggled with for years. Air pollution has become a serious problem in most major Mexican cities, including those along the Mexican-U.S. border. The National Environmental Institute (INE) estimates that vehicles generate about 75 percent of air pollution, while industries and other fixed sources, such as gas stations, restaurants, electricity generating plants, and laundromats account for the remainder. Unpaved streets and roads in many urban and rural areas, along with agricultural activities, also produce significant amounts of particulate matter that impact regional airsheds.¹

Air pollution from mobile sources, such as cars, trucks, buses, and motorcycles, probably pose the largest problem to the population and the environment in major cities along the border. More than half of the vehicles in Mexico are models that are more than 10 years old, have no catalytic converters, and are often in a poor state of repair. Thus, they emit high quantities of contaminants into the atmosphere.²

In the border region, pollution from vehicles and other sources is compounded by dry climatic conditions. Air pollution produced on one side of the border is often transported across the border by winds. Many border twin-cities share the same air basin. Thus, regional transborder air pollution is best addressed on a binational level.

In the parts of Baja California farther from the border and in Baja California Sur, air pollution is not a significant problem. The region is sparsely populated and there is virtually no heavy industry. Therefore, U.S. companies interested in exporting air pollution control equipment to the Baja California peninsula should concentrate their efforts mainly in the border region.

Government Air Pollution Policies and Programs

Air Pollution Policies

SEMARNAT, the Mexican environmental secretariat, has developed a six-year environmental protection plan called the National Program for the Environment and Natural Resources (Programa Nacional de Medio Ambiente y Recursos Naturales–PNMARN) that includes a National Air Program (Programa Nacional del Aire). Although this air pollution prevention program focuses mostly on reducing emissions and smog in Mexico City, attempts are being made to extend the program to other major Mexican cities like Tijuana. The program aims to control the levels of carbon monoxide and sulfur dioxide to comply with the national air pollution standards.³ The Federal Attorney General for Environmental Protection (Procuraduría Federal de Protección al Ambiente–PROFEPA) is responsible for enforcing standards and regulations. PROFEPA levies significant fines to discourage pollution and encourage the implementation of cleaner technologies. This “polluters pay” approach is an important part of Mexico’s pollution control strategies.

Since 1994, another program has been developed and progressively implemented: the Mandatory Vehicle Verification Program (Programa de Verificación Vehicular Obligatoria), mainly for Mexico City. This program sets maximum emission limits, displayed in Table 1, for both diesel and regular gasoline vehicles and requires periodic emission checks for vehicles. There are more than 400 verification centers (VERIFICENTROS) to test emissions of gasoline vehicles, 210 mobile stations to test emissions of diesel vehicles, and 350 air monitoring stations to identify levels of vehicles emissions in major cities. Since 1994, car manufacturers in Mexico have also been required to install catalytic converters in all newly manufactured vehicles.⁴

Table 1: Maximum emission limits for vehicles weighing 2,727 kg (6,000 lb) or less⁵

Vehicle Model/Year	Hydro carbons Max. (HC) ppm	Carbon Monoxide Min. (CO) % Vol	Oxygen Max. (O ₂) % Vol	Dilution (CO+CO ₂) % Vol
1979 & older	450	4.0	6.0	7.0 + 18.0

Vehicle Model/Year	Hydro carbons Max. (HC) ppm	Carbon Monoxide Min. (CO) % Vol	Oxygen Max. (O ₂) % Vol	Dilution (CO+CO ₂) % Vol
1980–1986	350	3.5	6.0	7.0 + 18.0
1987–1993	300	2.5	6.0	7.0 + 18.0
1994 & subsequent	100	1.0	15.0	7.0 + 18.0

Another government program that addresses the problem of air pollution is the PROAIRE program, which has been in effect for a number of years in Mexico City. This program, introduced in 1996, proposes solutions to reduce mobile and fixed source air pollution through the conversion of all public transportation vehicles from gasoline to natural gas; the establishment of stricter limits for nitric oxide, a colorless gas that is formed by the combustion of nitrogen and oxygen; and the introduction of TIER II vehicles (TIER II vehicles meet U.S. emission requirements).⁶

To date, both of these programs have been implemented mainly in Mexico City, but it is expected that they will be extended to major cities in the border region in the coming years.

Mexican and U.S. Ambient Air Pollution Standards

Table 2 demonstrates that air pollution standards in Mexico are quite similar to those in the United States. Enforcement is an ongoing concern and is a priority of the Fox administration.

Air Pollution Control Programs and Projects in the Border Region

Within the Mexican-U.S. border region, and specifically in the California-Baja California region, there are several air quality monitoring programs that involve U.S. and Mexican collaboration. The agencies involved on the U.S. side include the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). On the Mexican side, the National Environmental Institute (INE), Secretariat for the Environment and Natural Resources (Secretaría Nacional para el Medio Ambiente y

Recursos Naturales–SEMARNAT), and the Technological Institute of Tijuana (Instituto Tecnológico de Tijuana–ITT) participate in the program.


There are currently two projects underway. One is the Tijuana-San Diego Air Program and the other is the Mexicali-Imperial Valley Air Program. Both have been in effect since 1995. A number of air monitoring stations measure the levels of nitrogen oxides, ozone, carbon monoxide, sulfur dioxide, particulate matter (PM-10), lead, and select airborne toxic compounds in the air. The Border Information Center on Air Pollution (Centro de Información sobre Contaminación del Aire–CICA) makes the data analyses available after verification through its web site.⁷

Table 2: Comparison of Mexican and U.S. Federal Air Pollution Standards⁸

Pollutant	Mexican Standards		U.S. Standards	
	Standard in Units	Time Period	Standard in Units	Time Period
Ozone	0.11 ppm	1 hour	0.12 ppm	1 hour
Sulfur Dioxide	0.13 ppm 0.03 ppm	24 hours Annual*	0.14 ppm 0.03 ppm	24 hours Annual*
Nitrogen Dioxide	0.21 ppm	1 hour	0.053 ppm	Annual*
Carbon Monoxide	11 ppm	8 hours	9.00 ppm	8 hours
Total Suspended Particles (TSP)	260 µg/m ³ 75 µg/m ³	24 hours* Annual		
Particulate Matter the size of 10 microns or less (PM-10)	150 µg/m ³ 50 µg/m ³	24 hours Annual*	150 µg/m ³ 50 µg/m ³	24 hours Annual*
Lead	1.5 µg/m ³	3 months	1.5 µg/m ³	3 months

**Arithmetic mean*

Recently, CARB, in coordination with the California Environmental Protection Agency (Cal/EPA), the Bureau of Automotive Repair (BAR), and the city of Tijuana, participated in the development of a pilot vehicle emissions inspection program in the city of Tijuana. This program aims to make emission inspections mandatory for both diesel and gasoline powered engines and is meant to enhance the air quality in the Tijuana region. The first step of the smog check program only applies to Tijuana's 800 official vehicles. Plans exist to extend the program to include Tijuana's taxi fleet and,



ultimately, all vehicles in Tijuana.⁹ As environmental administration becomes more decentralized in Mexico, more municipalities will become involved in local environmental regulation and enforcement. For example, Tijuana now has a municipal environmental department and a set of environmental regulations. One of its first activities will be the vehicular emissions control program mentioned above. The Trust Fund for Electric Energy Savings (FIDE), a private Mexican trust fund that was created through the initiative of the Federal Electricity Commission (Comisión Federal de Electricidad–CFE) finances various projects that deal with air emissions control and reduction. It is currently completing a project in which older air conditioning coolants in businesses and homes are replaced by newer ones that are less harmful to the ozone layer. While not border-specific, this program could be of assistance for future projects in the border region.¹⁰

Best Market Prospects

Air pollution is a major concern in the border area since it impacts both Mexico and the United States. Thus, government agencies on both sides of the border have been actively promoting “cleaner air” strategies. Market prospects for exporters of air pollution equipment are good in northern Baja California for both mobile source and fixed source polluters. It is important to note that air emissions from fixed sources for federal facilities, such as the power plants of the CFE or PEMEX (Petróleos Mexicanos, the national oil company) processing facilities, are set by the Mexican federal government. For large industrial operations, emission standards are also set by federal statute.

Mobile Sources

New inspection stations throughout Baja California will require automobile emissions testing equipment. Equipment for air quality monitoring stations is also needed in the Tijuana-Playas de Rosarito-Tecate-Mexicali border region. Catalytic converters and other pollution control equipment are also in demand for new and used vehicles. The demand for compressed natural gas (CNG) conversion kits, CNG

vehicles, and CNG filling stations should increase substantially in the next few years once the requisite natural gas distribution systems are operational.

Fixed Sources

Due to the fact that the Mexican government is actively promoting a switch to natural gas and low sulfur oil, U.S. firms specializing in natural gas-fired boiler and related conversion technologies will find market opportunities. U.S. firms specializing in end-of-pipe treatment will need to research the market carefully to identify realistic opportunities for the sale of equipment such as scrubbers and baghouses. The market prospects for these products should be fairly promising in the Tijuana-Mexicali region. The market for vapor recovery equipment for gas stations is also very attractive, but since the installation of vapor recovery systems is a fairly recent development, their success has not yet been adequately measured. A list of best sales prospects follows in Annex A.

References

¹ International Trade Administration, U.S. Department of Commerce. 2001. "Current Environmental Challenges." *International Market Insight Reports*. Washington, D.C.: International Trade Administration, U.S. Department of Commerce.

² Ceron, Francisco. 1999. "Vehicle Emissions Control Technologies." *Market Research Reports: Industry Sector Analysis*. Washington, D.C.: International Trade Administration, U.S. Department of Commerce.

³ Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2001. "Programa Nacional de Medio Ambiente y Recursos Naturales 2001–2006." (Cited 16 January 2002), http://www.semarnat.gob.mx/programas/medio_ambiente.shtml.

⁴ Ceron 1999

⁵ Ceron 1999

⁶ Secretaría de Medio Ambiente (SMA). 2002. "Hacía un programa de Calidad del Aire 2000–2010." (Cited 15 April),

http://www.sma.df.gob.mx/publicaciones/aire/prog_cal_aire00_10/2000/esp/capitulo02.pdf;

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⁷ U.S. Environmental Protection Agency (EPA). 2001. "U.S.-Mexico Border XXI Frontera XXI. Mexicali-Imperial Valley and Tijuana-San Diego Air Programs." (Cited 30 November), <http://yosemite1.epa.gov/oia/MexUSA.nsf>.

⁸ U.S. Environmental Protection Agency (EPA). 2001. "Air. U.S.-Mexico Border Environmental Indicators 1997: chap2." (Cited 7 December), <http://www.epa.gov/usmexicoborder/indica97/chap2.htm>., and U.S. Environmental Protection Agency (EPA). 2002. "National Ambient Air Quality Standards." (Cited 12 April), <http://www.epa.gov/airs/criteria.html>.

⁹ Norzagaray Roman, Rosario. 2002. Interview by IRSC staff. Dirección Municipal de Ecología, Tijuana, Baja California, Mexico (March 2002).

¹⁰ Urteaga Dufour, José Antonio. 2002. Interview by IRSC staff. FIDE, Tijuana, Baja California, Mexico (March 2002).

¹¹ Ceron 1999 and The U.S. Commercial Service. 2002. "Mexico Country Commercial Guide FY 2002." (Cited 15 April), <http://www.usatrade.org/Website/CCG.nsf/CCG-Mexico2002-CH-5:-0055762>.

Annex A¹¹

Best Sales Prospects

- Air monitoring station equipment and related data acquisition systems
- Air monitoring stations for diesel engines
- Baghouses and scrubbers
- Catalytic converters
- Dual natural gas/gasoline fuel systems
- Gas analyzers
- Gas flow meters
- Gas meters
- Natural gas storage tanks equipped with meters for service stations
- Public electric vehicles
- Software programs to measure vehicle air emission